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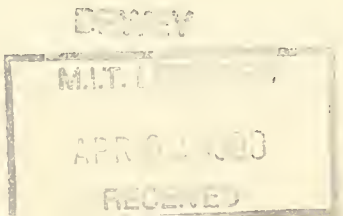

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IDENTIFYING THE ATTRIBUTES OF SUCCESSFUL EXECUTIVE SUPPORT SYSTEM IMPLEMENTATION

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ABSTRACT

This paper identifies eight factors critical to the successsful implementation of executive support systems. Findings are based on interviews done in 30 companies which have tried to implement computer-based support systems for top management. The factors identified cover issues such as sponsorship, linking the system to a business objective, technology used, and the management of data, political resistance, and system evolution. A case study of one company's attempts to implement an executive support system is presented to illustrate the eight factors.

The use of computers by top management, known as executive support systems (ESS), is a steadily growing phenomenon, one that can have major impacts on the nature of executive work and the way organizations function. Like any new application of information technology, however, ESS is fraught with pitfalls. Technological, organizational, psychological and educational issues all contribute variables that make the implementation of executive support systems difficult.

Much has changed in the four years since Rockart and Treacy first identified the executive computing phenomenon (Rockart/Treacy, 1982). At the time they found only a handful of top managers making use of the technology. But, in late 1984, a survey of 45 randomly-selected Fortune 500 companies revealed that two-thirds of them had at least one executive, and usually several, with a computer terminal on his or her desk (De Long/Rockart,1984). Slowly but steadily the concept of top management computer use is gaining credibility.

One of the major barriers to the spread of ESS has been our lack of understanding of how to implement these systems. Unlike more mature I/S applications, such as transaction processing and decision support systems, we have lacked sufficient experience to develop an appropriate methodology for implementing ESS. Implementation of systems for executives presents problems not experienced in systems

designed for middle management. The fragmented nature of executive work, the high degree of environmental uncertainty at this level of the organization, and the political ramifications of giving top management more and better information make implementing ESS a special challenge.

The purpose of this paper is to propose an outline of critical ESS implementation issues, based on a preliminary analysis of field studies done at the Sloan School's Center for Information Systems Research over the last eighteen months. Our framework is based on an in depth study of almost 30 companies which have tried to install ESS. The research involved extensive field interviews with both ESS developers and users in firms representing a broad cross section of industries. To illustrate many of the critical points in the paper we will use a case study of one computer company's attempt at implementing an executive support system.

Defining Executive Support Systems

One of the problems with implementing executive support systems is the difficulty in defining the concept. There is still great confusion about what really constitutes such a system. What one firm might consider an executive support system, another will discount as "just a personal computer" or "just electronic mail." But, unless the

boundaries and purpose of an ESS are carefully conceived, it is hard to implement an effective system.

Levinson (1984) defined ESS as "terminal-based computer systems designed to aid senior executives in the management of the firm." We have defined it a little more specifically (De Long/Rockart,1984) as "the routine use of a computer terminal by either the CEO or a member of the senior management team reporting directly to him (or her). The use may be for any management function, and these systems can be implemented at the corporate and/or divisional level."

FACTORS IN ESS IMPLEMENTATION

There is a substantial body of literature on information systems implementation (Markus, 1979). Unfortunately, there is no clear agreement in this literature as to the factors that are most significant in making the implementation process successful or as to the best process to follow. As we have looked at dozens of attempts at implementing ESS, there seem to be eight critical factors in assuring top management acceptance and use of a system. They are:

1. A Committed and Informed Executive Sponsor. There must be an executive who has both a realistic understanding of the capabilities (and limitations) of ESS, and who really wants the system so badly that he or she is willing to put

considerable time and energy into seeing that a system gets developed.

2. An Operating Sponsor. Because the executive sponsor usually lacks sufficient time to devote to the project, it appears very worthwhile to have an "operating sponsor" designated to manage the details of implementation from the user's side. This person is usually a trusted subordinate or an executive assistant who is well acquainted with the sponsor's work style and way of thinking.

3. Clear Link to Business Objective(s). The ESS must solve a business problem or meet a need that is addressed most effectively with I/S technology. There should be a clear benefit to using the technology. It must provide something that would not otherwise be available, such as graphical displays, data with textual annotations, etc. Simply getting access to the "same old data" through a terminal may not be as good as the existing paper-based system, unless there is some value added to the data.

4. Appropriate I/S Resources. The quality of the ESS project manager on the I/S side is most critical. This person should have not only technical knowledge, but also business knowledge and the ability to communicate effectively with senior management.

5. Appropriate Technology. The choice of hardware and software used has a major bearing on the acceptance or rejection of a system. One of the early barriers to executive support has been the lack of hardware and software that could meet the demands of highly-variable executive work styles and environments. Things are getting better, however, as more and more products are being designed specifically for the ESS market.

6. Management of Data Problems. The physical and technical ability to provide access to reliable data can be a major issue in ESS development. Aggregating, accessing and managing production databases in a corporation with multiple divisions can be the biggest physical roadblock to ESS implementation.

7. Management of Organizational Resistance. Political resistance to ESS is one of the most common causes of implementation failure. An ESS alters information flows and this always has the potential to significantly shift power relationships in a company. Anticipating and managing the political ramifications of an ESS will remain a potential problem throughout the life of the system.

8. Management of Spread and System Evolution. An installation that is successful and used regularly by the executive sponsor usually will produce pressures for rapid evolution of the system as the user quickly recognizes other potential applications. A useful ESS will also inevitably produce demands by peers or subordinates for access to a similar system. Managing the process of "spread" means identifying the specific job function, technical orientation, work style, and specific information support needs of each potential user, and taking that into account when expanding the system.

It is worth pointing out that these eight factors in ESS implementation are essentially prescriptive, based on a sample of about 30 cases. Most, or all, of the eight elements appear to be present during the implementation of the systems we have studied, which have been deemed most successful by both the executive users and the developers. While we cannot prove that the factors listed above will lead to system acceptance, we do have substantial evidence that failure to consider these issues certainly increases the chances of system failure.

To illustrate these eight factors more effectively, we present a case of one computer company's attempt at

implementing an executive support system. The case is helpful because it clearly illustrates each of the factors we have discussed above. The case has been significantly disguised.

STOWE COMPUTERS, INC.

In the early 1980s Stowe Computers, Inc. (SCI) experienced serious financial difficulties. The firm lost $90 million in 1981 and was on the verge of bankruptcy. Survival was the fundamental issue for the company when Matt Brennan was brought in as the new president and CEO that year. Brennan's word quickly became law and decision making was very centralized in the early days of his tenure at SCI. During this period, about 11,000 people, or one-third of SCI's workforce were laid off, and the president worked on an entirely new product strategy in an effort to reverse the company's sagging performance.

SCI was a technology-driven company whose major hardware business was selling mainframes to data processing departments. The concept of end user computing was still relatively unknown in 1981, and the emerging personal computer segment of the market was not regarded as strategically important by the SCI culture.

Corporate information systems (CIS), was the firm's very traditional, centralized DP department. The head of CIS,

Walter Zink, had no secretary and operated his department with a primary objective of keeping costs down. This strategy was traditional in CIS, and resulted in the department running the oldest mainframes and operating systems available. It often used equipment that had been returned by SCI customers for newer models. Several executives characterized SCI's internal information systems as "archaic".

Two other executives joined SCI at the same time Brennan became CEO. Phillip Dutton was named executive vice president for sales and marketing, and Brian Starr became chief financial officer.

One of Brennan's top priorities after he arrived was to change SCI's technology-focused culture and its product strategy, and he saw executive support systems as a key part of this plan. Brennan wanted to improve productivity at the executive level, while providing a laboratory and a showplace for new product development.

In addition to these objectives, the CEO felt personally frustrated by the lack of management information that was available to him to run the company. At his previous company Brennan had a terminal on his desk with direct access to the corporate mainframe. Not only did he now feel he did not have enough information, but the CEO also believed the corporate controller was providing the existing information

too slowly.

To address these problems Brennan asked one of SCI's mainframe-oriented product development groups if they could help. They proposed a 50-person project to tackle the problem of executive support. Brennan looked for another more practical alternative and found it in a small internal consulting group managed by Tom Singletary. Singletary, who had extensive experience as an internal auditor and as a systems developer in CIS, reported directly to CFO Brian Starr.

The CEO asked Singletary and his group of senior consultants to develop an executive support system. Singletary agreed and, in April 1982, he began a study of the information currently being used by SCI's senior management. When CIS Manager Walter Zink heard about the project, he urged Brennan and Starr to shift Singletary's reporting relationship to CIS. Top management, however, decided that Singletary should continue to report to the CFO.

In July 1982, Singletary's group produced a report recommending the development on an ESS prototype with the ultimate objective of providing SCI's 500+ core managers with "user friendly" access to essential performance information. Top management had put two constraints on any system Singletary would develop. First, it had to be capable of being made secure against any unauthorized access. Second,

only SCI products were to be used because of the strategic nature of the system.

Singletary's report recognized that ESS implementation would require support staff with broad exposure to business as well as technical competence in both the hardware and software used. It estimated full implementation of the system would take 15-20 months and argued that implementation should be done by a small group which would report directly to a senior executive.

The report presented two options for implementation. The first was to identify critical performance factors based on the company's strategic objectives and to identify management information needed to support them. Singletary explained that the problem with this option was that Brennan had only recently set out a new strategy for the company, and the consultant felt he couldn't get top management support for entering a process of again redefining what the company was about. Singletary said he didn't consider the option "politically feasible."

The second option was to identify current planning activities and integrate the plans and actuals data currently used in those activities into the ESS prototype. Singletary's report acknowledged that the drawback of this approach was that it relied on the existing plan vs. actual data to design the new system, even if they were not what should be

included. Despite this drawback, Singletary's group chose this approach when the CEO approved development of the prototype. "We were looking for relatively quick results, and this was the pragmatic approach," he said.

In December 1982, Singletary's group returned with a prototype ESS that used SCI's Lynx terminal, one of their most successful products. After a demonstration of the Lynx ESS, Brennan and CFO Brian Starr told Singletary to produce the prototype and install it in the offices of the corporation's 14 senior managers. Using the Lynx terminal, the system would be networked to a mainframe at the firm's data center 20 miles from corporate headquarters.

Lynx Design and Installation

In March 1983, Malcolm Livingston was named the new manager of CIS, replacing Zink, who left the company. Livingston was chosen over Singletary who had made a bid for the job.

Soon afterwards, in a move that Brennan did not consider significant, CFO Brian Starr shifted Singletary's reporting relationship to Livingston. The CFO said he did not have enough time to manage Singletary properly. Singletary had a very uneasy relationship with his new boss, whom he thought ran CIS "like a batch computing bureau." Singletary

said:

> Shifting my reporting relationship to Livingston affected the visibility of my group. Livingston pretty much gave me free reign, but I lost some of the direction I had been getting from Brennan and Starr. I think some of the inspirational direction from Brennan started to decline because he assumed Livingston was providing it. But he wasn't.

Through the spring of 1983, Singletary's group spent time trying to overcome technical problems with the mainframe operating system the Lynx terminals would be using. Among the problems the development group faced was a lack of applications-oriented software suitable for executives and a very unfriendly operating system, which was difficult to log into. As technical problems continued to plague the project and as the design process progressed, it became clear to Singletary that his group was going to spend more time on technical rather than business issues.

"As a result," he said, "we didn't approach the project from a full understanding of how the system would be used. Rather our purpose was just to help share more information among the executives."

But even the task of providing information proved more difficult than expected. Singletary had a very difficult time getting the corporate controller to release information for the system. "We represented a challenge to the corporate

staffs, and the controller was upset at the idea of the CFO coming to us for information," Singletary said.

The controller's primary argument for not releasing information for the Lynx system was security. His concerns, however, were not unjustified. SCI had gone through a very embarrassing experience several years previous when some of the company's confidential financial information inexplicably had appeared in a local newspaper. That experience made the finance department extremely cautious about releasing data to anyone.

By the summer of 1983, Lynx terminals had been installed on the desks of 13 senior executives. (The vice president of personnel refused to allow one in his office, contending he had no use for it.) Singletary and his three consultants showed each executive the capabilities on the system and then asked them how they would like to use it. The system had a menu with five applications directly available, including corporate performance summaries and modeling. Technical problems, however, continued to make the software difficult to learn and use. For example, different packages required different "log off" procedures and data was outdated. As a result, the Lynx system was all but ignored by executives shortly after it was introduced, even though Singletary's group continued to try to enccourage its use for some time. Marketing EVP Phillip Dutton described his

reaction to SCI's first ESS:

> Initially, it was going to be a product that we could network together and put up a financial database, so I could get into it and look at instantaneous trends, results, etc. But the network didn't work very well and it kept breaking down, so the system wasn't up a lot. Also, because it was a special project, the system was always late getting the data loaded onto it, so the data was always out of date. After finding the system out of date or broken a few times, then I just began referring back to the printed reports.
>
> It was also a terrible job to get through the security system. Security was a major issue because the controller was fanatical about it. He made damn sure that the system went through the nth level of security. But, in the end, it would take the normal ad hoc user ten minutes to get through the security section.

In the end, there was a lot of interest but no direct use by the executives themselves, conceded Singletary. To get at a particular "what if", the executives would actually get a staff member to operate the terminal for them.

Reorganization

In May 1983, Brennan began a major reorganization within SCI. The product development and marketing people were integrated into 15 product groups each with a product line or industry focus, such as minicomputers, insurance industry, or the federal government. The product groups defined markets and developed the products/services to be brought to those

markets and sold by the geographically organized sales units. The Decision Support Product Group (DSPG) was created to develop and market products related to DSS and ESS. DSPG was headed by Gary Marx.

Early Development of PC-based ESS

For some time, Brennan had been pressing DSPG management to get an ESS product into the marketplace, and simultaneously, he and Starr, the CFO, were still looking for something to support SCI executives. CIS remained responsible for implementing any internal systems for top management. CIS had to rely on the product groups, however, to do the actual hardware and software development for ESS, which would also ultimately be sold as products in the external marketplace.

Meanwhile, product developers in DSPG felt unusual pressure to deliver something through CIS because Brennan had made it clear he wanted a system on his desk "tomorrow." It was decided that the capabilities of the new ESS would be based on external market research done previously by DSPG. No interviews were done inside SCI. Rudy Hancock, who was in charge of ESS product development for DSPG, explained:

> The key lesson from the research was the need for relevance to the executive's job. Provided you gave them what they needed, a surprising number of executives were prepared to deal with complex interfaces. We also concluded that executives wanted access to many capabilities at once, and the

> ability to switch tasks and information sources quickly. This meant we had to put a lot of intelligence on their desks. Also, we were up against a very short time scale because Brennan had given us a deadline, which meant we couldn't design something new. We had to use existing equipment.

Singletary's Lynx system was not ready to market and lacked the local processing capabilities DSPG wanted, so Hancock began looking outside to see what high quality graphics terminal could be brought into SCI. The decision was made to use an intelligent color monitor built by a Japanese company, which could be linked to SCI's own recently-developed personal computer (PC). The PC offered more local processing power than the Lynx for individual applications, and using the Japanese-built monitor would give SCI the chance to market its first color graphics terminal.

Hancock conceded that, from the start of the PC development project, things didn't move as fast as expected. But, because of the continuing pressure from Brennan, DSPG introduced a prototype of the ESS product to top management in October 1983. The developers had adapted some of the software technology from the Lynx system and created a generalized menu system that could be personalized for individual users. Gary Marx, head of the Decision Support Product Group, introduced the PC system prototype of what DSPG planned to market as DSS for executives. The system included a graphics package, called "Giraffix," which was designed to create graphics on the PC once data was

downloaded from the mainframe.

Decision Support Group 'Deskilled'

Since Singletary's team of consultants had been reassigned to CIS, they had become known as the Executive Support Team (EST). Their primary responsibility continued to be encouraging and supporting top management computer use. By August 1983, Singletary had begun to taken on broader responsibilities within CIS, so he brought in Susan O'Donnell to manage the Executive Support Team. O'Donnell, whose primary strengths were in technical areas, was told the EST's target population was the top 20 executives. Virtually no progress was made, however, in developing Lynx use among executives between August and October, in part, because of communication problems that existed in trying to operate the ESS on a remote mainframe in the corporate data group. The system seemed to be "gathering dust" on most executive's desks.

In November, EST was set up with access to half a new mainframe at corporate headquarters in anticipation of its hardware needs for supporting top management in the future. But other things were happening to EST that reduced its ability to support SCI executives. "Brennan wanted to deskill EST activities so the group could be run by only four junior

people," said Singletary.

He explained that until O'Donnell took over the EST in August there had been three senior consultants involved in the ESS activities who were used to dealing with top management. While three senior people could support more executives, Singletary said that O'Donnell, with her staffing now restricted to junior people, could not cope with supporting more than a couple of top managers. By late 1983, EST was staffed with two analysts and two programmers.

"We had junior people trying to provide support to Brennan. They just couldn't do it," said Singletary. "In retrospect, I leaned too far on technical expertise."

PC System Development

Brennan was upset when the DSPG had not delivered its new PC-based executive support system by early 1984. As a result, CFO Brian Starr met in early February with CIS Manager Malcolm Livingston, Singletary and O'Donnell to discuss the problem and make sure everything possible was being done to get the product out. At the meeting, Starr expressed doubts that Gary Marx's product group was going to be able to develop the PC-based ESS software on schedule, despite pressure from Brennan.

Thus some decisions were made. Starr told the CIS

people that he wanted a new ESS terminal implemented for the top three people in SCI (Brennan, Starr and Dutton), and the CFO would decide what would be on the system. Starr then looked at what they could deliver in short order. He reviewed the original Lynx menu and said he wanted corporate performance summaries, inter-company comparisons, the five year planning model, and some product line profitability statements in the PC-based system.

Marketing EVP Phillip Dutton offered this perspective on Starr's decision to get involved in the ESS development:

> Primarily, I think, he wanted to get a system that would work and deliver things that he needed and not have all these different folks involved. He was primarily concentrating on the financial reporting parts of the system that he needed.
>
> At that stage we'd had a lot of non-progress, so Starr picked up the baton to get some system out so we could get at our own data and also use it to show customers what innovative people we were.

Singletary explained the design problems that remained for CIS and the product groups:

> Despite Starr's plans and the summer installation deadline, as of February, the PC was not yet actually available, and the graphics, LAN, and applications software was still in development. None had been field tested or released as products. Thus, we were working to a time scale which effectively said, 'We expect to get software at X point and, meanwhile, the graphics are being developed and we hope the two will work together.'

After the meeting with Starr made it clear the PC project was top priority, a series of weekly meetings were

set up between EST people in CIS and those in the product groups involved with PC/ESS development. The weekly meetings went on until July but, despite the pressure from top managment, the project slipped almost a month behind schedule because the software was still not available, said Singletary.

Rudy Hancock, ESS project manager for DSPG, offered this perspective on the process:

> Not only did lots of technical problems arise in the meetings with CIS, but personality clashes among those involved added to the tension. We were shouting at each other a lot.
>
> The people from CIS were looking after senior management and their views of what the system should do were often at variance with our views. At the weekly meetings it became clear that SCI's top executives were very different individuals with different requirements and needs, attempting to be satisfied with a single product. Brennan was happy with a keyboard, easily understood it, and could do complex things on the system. Starr expected that when the system was switched on it would automatically show yesterday's sales results. Other executives were more normal and as casual users needed something that was simple and clearly labelled.

In July 1984, a meeting was held to demonstrate the progress made on the PC-based ESS. Among those attending were Livingston, Singletary, Starr, Marx, and a consultant who had been brought in to help keep the ESS project on track. Brennan showed up at the meeting unexpectedly.

O'Donnell demonstrated how the PC could do modeling on the mainframe and produce graphics on the PC. Brennan watched the demo and told Marx, whose group had developed the

software, that the PC was too slow in generating graphics.

The consultant had a similar reaction. "It was painfully slow and too awkward to use. Too many keystrokes were needed. If I had work to do, I couldn't work at that speed," he said.

Despite his criticism of the PC's slowness, Brennan was encouraging. "OK, you've got something there. Now what are you going to do with it?" he asked. "I want to spread this around to the executive staff, and we should be using it in the product groups to improve their access to management information." Brennan then turned to Livingston and asked, "How many are you proposing to install this year?"

The CIS manager hesitated for a moment and then responded, "We've got a budget for 40."

Thus it was agreed that CIS would install 40 PCs -- 20 in the corporate offices and 20 among executives in the product groups -- as soon as possible. This became known as the "40 PC project."

Dutton, sales and marketing EVP, offered this view of the decision to implement 40 PCs for executives: "Brennan made an emotional decision that we had to get PCs on people's desks. It was one of those gut feels. Get people more involved in what sits on their desks, then worry about what they're going to use it for."

Shortly after the "40 PC project" was initiated a

major change hit SCI. The company was acquired by Electronics International Group (EIG), a large multi-national conglomerate. This takeover led to a top management shakeup. Brennan became chairman of the SCI subsidiary and a senior executive in EIG. In September 1984, EVP Phillip Dutton became president of SCI. Shortly afterwards, Starr left the company and a new CFO was named.

PC Installation

PCs were installed in the offices (and some homes) of SCI's executives during the fall of 1984. Use of the technology by top management varied significantly, and depended a great deal on each manager's particular function and work style.

Brennan commented on his own experience and needs for computer support as SCI's chairman:

> So far they have been unable to provide me with support where I need it, such as at home. CIS came out with a bunch of junk which was so awful I sent it back. It was a PC with a modem, but it covered the whole desk.
>
> What I need primarily is facsimile, electronic mail, voice mail, and all the instant messaging capabilities; also, competitive assessment analysis, industry news, and, lastly, financial information about our own activities. I think that's the difference between senior people who tend to look at an industry from a strategic overview and line managers who are deeply engrossed in their own financial activities.

When CIS installed Dutton's PC, the new president

found the experience not unlike the one he had with the Lynx system earlier.

> Guys came up and I had about two 45 minute training sessions. That was adequate to get going, but getting past the security checks was still a problem, although it was easier than with the Lynx. More important, the data was not useful enough for me to really want to spend a lot of time getting into the system. It was still often a month out of date.
>
> We were putting more management effort into that so-called decision support system than we were on trying to figure out how we could get our data faster, regardless of what format it was in. We were busy looking at the graphics and how to get it up onto screens, and how the LAN system worked, when, in fact, all the data we were looking at was three weeks out of date.
>
> So, our priorities were in the wrong place. What we should have been doing is spending all of our management effort making sure that we could do the consolidations in two days, and then figure out how to use it.

The primary function of the vice president for technology planning is to make decisions about R&D investments. He commented on his experience with the PC-based ESS:

> My hackles were up even before the system arrived. There was no way I was going to have a system someone told me I must have. I publicly made a point of how hard it was to turn on and to get the system up, and the response time was pretty awful. Also there were some real problems with the command structure. The screen would say press button X to do something when really you were supposed to press button Y.
>
> Early on I made a nuisance of myself saying I don't want a package. Instead, I said I wanted an R&D project monitoring system, but CIS couldn't make the system flexible in that way. They tried to create a single package everyone would use, but they forgot that we all wanted to do something different. The fact that getting new capabilities

took six months was too long.

Besides, the bulk of my job is communication, not analysis. My real need is for communications support between me and my staff. Very little information for decision making in my job is financially based. Most of the information I use is highly subjective, and at least 50 percent of it is external. So, basically, my systems needs are for electronic mail, the ability to build customized systems, and for visibility into some of our existing operational systems.

The vice president of SCI's Office Systems Division is responsible for five product groups, including the PC product group. He said he spends half his time managing the product groups and the other half on corporate business not directly concerned with his division. He described his experience as follows:

I have a double interest in the PC. It is one of my products and I want to use it for corporate I/S. My PC is at home, though, because I'm never in the office. When I said I wanted it at home that created a problem. I have an encrypting modem which is expensive and difficult to set up, but that's because the controller wouldn't allow data out of the mainframe without encrypting it.

The main thing I use it for is typing longer documents, such as a talk or a strategy paper. I print it at home and get it rekeyed at the office because I can't squirt it into electronic mail. I've got electronic mail, but it's extremely unfriendly.

I also use the PC to go into the corporate databases to look at company and unit results. But I do this out of a sense of duty. I find the system clumsy to get into. You need three different passwords. But the real problem is there is nothing new in the data base. Corporate finance doesn't want to put anything in the data base until it has been presented at the monthly forecast meeting. As a result, they don't put data in until it's too old to be useful, so I never learn anything new from the system. Access to paper reports is faster.

I spend 70 percent of my time in reviews and

> meetings, and I'm in my office less than 10 percent of the time. When I do come in it is for a stack of tightly processed discussions. My time is tightly programmed. I do about 18 hours of reading a week, but almost always out of the office. For most of the stuff I read I attach a note with the action to be taken. Electronic mail wouldn't work for this.
>
> Logistics is critical. Anything I can do to save time will give me more time for planning. Otherwise, I'm rushing from one pile of paper to another and from meeting to meeting.

CIS continued to install ESS applications on the PCs sitting on the desks of SCI's top managers through December 1984. On January 8, 1985, almost three years after Brennan had first asked Singletary to implement an ESS, President Phillip Dutton sent a memo to CIS manager Malcolm Livingston and DSPG manager Gary Marx. These were the two people currently responsible for SCI's executive support systems. Dutton wrote:

> I have a decision support system hooked up in my office which I can assure you I never use. ...If I weren't such an optimist, I would despair. Please let me know when I can have something which is useful to me in my office.

STOWE COMPUTER CORP. AND LESSONS IN ESS IMPLEMENTATION

Let us look at Stowe Computer Corporation's experience in light of the eight factors in ESS implementation outlined earlier. How does the Stowe case illustrate the issues identified?

1. A Committed and Informed Executive Sponsor

In our research, rarely did we find an ESS being used by executives that had been initiated solely by the information systems department. Executive users must want and ask for the system themselves. There are three characteristics the executive sponsor must have. First, he or she must be committed to putting time and energy into the ESS project. Second, the sponsor's expectations of what is possible for the system must be in line with the physical limitations of the technology and data access.

Finally, the sponsor should have a realistic understanding of the implementation process itself and what the organization must go through to develop an effective ESS. The executive must: (1) understand the human and financial resources needed for the project; (2) recognize the need for an operational sponsor; (3) anticipate the organizational impacts of the system; and (4) anticipate and deal with

political resistance to the system's perceived impacts.

SCI's executive support project clearly had a sponsor in CEO Matt Brennan. Brennan wanted the system and was willing to spend time seeing that it was developed. But it was also important for the executive sponsor to have a realistic expectation of both the ultimate capabilities of the system and the organizational issues surrounding the implementation process. Brennan seemed to lack both of these, although, in his defense, a desire to have the firm learn about the implementation process was one of the reasons he encouraged the ESS projects in the first place. Nevertheless, the predictable shortcomings of an ESS developed in this setting created frustration and disillusionment for the chief executive.

2. An Operating Sponsor

The task of managing ESS development is frequently, but not always, delegated to a trusted subordinate who becomes the "operating sponsor" (Levinson, 1984). This sponsor ideally is a person who can communicate easily with both the executive user and the ESS designers. He or she serves as a go between helping to match business needs with technological capabilities. Quite often, where the CEO is the executive, or initiating, sponsor, the task of operating

sponsor often falls to the CFO or the controller.

In the SCI case, the CFO assumed the role of operating sponsor at times, particularly with the PC project. Before that, however, he had delegated away the operating sponsor's role when he shifted Tom Singletary's reporting relationship to the CIS manager. When that happened, the input Singletary received from top management was diminished because he was reporting to the CIS manager, not the CFO, and his project came to be viewed as "just another DP function."

In general, the SCI case is an example of a lack of clarity about sponsors' roles and shows the confusion that can arise when the role of operating sponsor is not made explicit and is filled only intermittently.

3. Clear Link to Business Objective(s)

The irony of ESS is that often executives demand systems on what seems like such short notice that defining the business objective of a system is probably the most frequently ignored activity in the implementation process. It is assumed the executive is too impatient to go through such analysis, the ESS developers are too afraid to ask for such input, or the developers don't consider it important to identify a link between specific business needs and the technology. As a result, the systems usually do not take full

advantage of the unique benefits the technology could provide, such as faster access to data or more effective communications.

Brennan identified a need for the system on several levels: (1) to increase his own access to information; (2) to improve executive productivity; and (3) to develop an ESS product for the marketplace. Not only are these multiple objectives in conflict with each other, but they are also too vague to be useful in linking the technology to internal business problems. In this case, Brennan seemed most concerned about getting an ESS product to the marketplace, while SCI's CFO Brian Starr was pushing CIS for a system that would meet the needs of his finance function. Thus, the ESS developers were getting mixed signals from the initiating sponsor, Brennan, and Starr, who at times acted as the operating sponsor.

In the case of the Lynx ESS, Singletary actually decided the system's capabilities because he found it so difficult to get executive input. He conceded that his group did not actually know what the system would be used for. Their only objective was to help executives share information better. Unfortunately, this was not an important business objective for top management. For the PC-based ESS project, the CFO dictated the applications. In this case, the only business objectives the CFO had in mind were those of his

finance function, to the dismay of other executives.

A result of the failure to explicitly link the technology to business objectives in both situations was that neither system met the needs of the executives who were given terminals. Brennan, for example, made it clear that his needs were primarily in the communications area, as did the vice president of technology planning. Yet, the electronic mail package on the PC system was universally criticized by the executives as terribly unfriendly and totally unusable.

4. Appropriate I/S Resources

Brennan chose Tom Singletary's small team of experienced consultants to implement an ESS over the monolithic, mainframe-oriented product development group that wanted to make it a 50-person project. In many ways, Singletary was the ideal person to fill the critical role as ESS project manager on the I/S side. Not only had he been a systems developer in CIS, but he also had extensive business experience managing the firm's internal audit group. He was a good communicator and was viewed as very professional by SCI executives. One drawback was that he never had a good relationship with the head of CIS.

Singletary's decision to bring in someone to replace him in running the Executive Support Team who had a technical

rather than a business orientation was an unfortunate move. Singletary's ability to understand business executives and to communicate with them was lost. This shift to a more technical orientation happened as Brennan was reportedly trying to "deskill" EST. Reducing the quality of the support staff from senior consultants with a business orientation to more technically-oriented junior analysts unable to relate to top management was a costly mistake.

It is also worth noting that Singletary's group existed outside the mainstream operations of CIS, reporting instead directly to the CFO. Our research has shown this to be not an unusual pattern. Often, a traditional I/S department just does not have the flexible, fast moving, sophisticated mindset needed to support executive users. ESS development teams are often composed of people like Singletary who come from the finance department and who also have I/S experience. Being outside, or on the fringe of the I/S department, however, can make it very difficult for ESS developers to get access to I/S resources because of political infighting.

5. Appropriate Technology

Although the ESS developers had to use SCI's own products, it is not unusual for companies to have their ESS hardware choices predetermined because one vendor dominates

the firm already. This explains, in part, the overwhelming predominance of IBM PCs that were found on executives' desks in our 1984 study of 45 Fortune 500 companies (De Long/Rockart).

The major technology decisions are usually in the software area. Many common problems with existing software are evident in the SCI case:

--Software packages cannot be integrated easily.

--Operating systems do not allow multi-tasking.

--Response time is too slow (sometimes a hardware problem).

--Complex command structures make systems hard to learn and remember.

--Extensive menus make the software easier to learn, but difficult to use quickly once they are mastered.

Often the capabilities of existing software -- rather than user needs -- determine the applications built into an ESS. What is presented to the user is, too often, crammed into what the software can deliver. Attempts to tailor a system to specific user needs often create a dilemma for developers. They are caught between users who want systems today and the realities of slow moving software development projects.

Response time is a common technology problem that must be anticipated. Our research shows that executives simply will not use systems when response time is more than a couple of seconds. The paradox is that when a system is initially

successsful and response time is good, more users inevitably want to get on the system. As a result, response time, unless it is well managed, can deteriorate and badly undermine the value of the system.

Compatability with existing systems is yet another issue, and like the problems above, it too surfaced in the SCI case. Note that the SCI executives could not communicate with their secretaries' terminals. This is a frequent problem and one that needs consideration before technology choices are made because the executive-secretary link is critical.

6. Management of Data Problems

Anticipating data management problems was clearly not done in the SCI case, and it becomes evident in the comments of Dutton and the vice president of the office systems division. Dutton pointed out that the fundamental problem was not the ESS design, but the fact that it took the company three weeks to close its books. He believed management effort would have been better spent trying to improve the firm's consolidation system, instead of trying to develop an ESS.

The office systems division vp raised another data management problem. Corporate finance would not release data for the ESS until it had been presented at the monthly review meeting. This meant the data was effectively out of date by

the time it got on the system. This raised an important question. At SCI, who owned the financial data -- corporate finance or the company?

ESS implementation frequently raises questions of data ownership. To be of value, an ESS must provide data faster than traditional paper-based systems, but that means changing existing information flows and, thus, the distribution of power.

7. Management of Organizational Resistance

Executive support systems, to be effective, must change information flows, improving the timeliness, the type, and the quality of the information users receive. Shifting information flows inevitably means threatening the distribution of power in an organization. This potential power shift will almost always be met by political resistance. There are several examples of political resistance in the SCI case.

CIS management did not like Singletary's ESS development team operating outside of their department, and they continually lobbied the CFO to shift that reporting relationship. Finally, Starr agreed, and when Singletary's group was reassigned to CIS, it lost a significant amount of the prestige it had in reporting directly to the CFO.

Singletary found it very difficult to get the corporate controller to release financial data for use in the ESS. The controller's justification was security concerns, but he also recognized that Singletary's system threated to replace him as top managment's primary source of financial information. Singletary recognized that his group's system was a threat to the corporate staffs. And he said that, even if the technical problems with Lynx had all been solved, the staff groups would never have allowed his group to gain significant power. The ESS was too threatening to them. But this potential power struggle never surfaced because of the technical failures of the system.

Data security was a particularly sensitive issue at SCI because of problems the company had experienced previously. It is sometimes hard, however, to separate when security concerns are the real reason a manager resists providing information, and when they are just a smokescreen for political resistance, most specificially in response to the fear of losing power. Security is a much talked about issue during the implementation process, and is often used as a reason for not providing executive access to certain information through ESS. In practice, however, when executives at SCI were given the option of protecting their data by requiring passwords for access, they rarely used these optional security measures. "Security turned out to be

mostly an emotional issue," said one product group manager.

Finally, one of the best examples of resistance came from the technology planning vp who outwardly rejected the PC-based ESS because he felt it had been imposed on him by someone else (the CFO).

8. Manage Spread and System Evolution

When an ESS is used by the executive sponsor, often the user's subordinates and some of his or her peers will also ask to be put on the system immediately. This is particularly true when the system contains information that reflects on the subordinates' performance. An effective system is also likely to result in a rapid increase in demand for new capabilities, as executives begin to understand how the technology can be applied in their work.

Both of these factors -- spread and evolution -- must be managed carefully. One important step is to identify explicitly who will be using the system and take into account their technical orientations, work styles, and job functions.

Starr's decision to design the PC-based ESS is a dramatic example of how a system can be implicitly designed for one executive when it is really intended to be used by a range of top managers. The response of the technology planning vp to the PC system best illustrates this problem.

Not only was he defensive about being told to use a system designed by and for somebody else, but the PC didn't even begin to address his needs for communication support and an R&D project monitoring system.

When trying to identify who the users of an ESS actually will be, an important consideration is whether installation and use of terminals is voluntary or mandatory. Some chief executives, like Brennan, will just insist that all of their vice presidents have terminals on their desks. Given the inherent technical, data, application, and support shortcomings of the pioneering ESS's today, this is an unworkable managerial demand, except in the most bureaucratic of organizations. Executives with a bias against computer support quickly find multiple reasons to doubt the system's effectiveness and will soon ignore it. Use of the system must be voluntary.

The ESS development process at SCI identified different work styles and technical orientations that were never acknowledged in the system design itself. For example, both the technology planning vp and the vp of the office systems division spent very little time in their offices and did a great deal of administrative work at home. It is unrealistic to expect an executive who is rarely in his or her office to make significant use of an ESS, unless he or she has a terminal at home. In the SCI case, there was a

clear correlation between amount of time spent in the office and the use of the ESS. All those executives who made significant use of computers at the office, spent more than 50 percent of their time there.

Another work style question concerns how an individual likes to absorb information. Some executives prefer looking at numbers, while others much prefer graphic presentations. Ironically, SCI's developers were convinced by their external market research that graphics were what executives wanted. But, at SCI, many top managers said they actually considered graphics unimportant, and they preferred getting information in numerical formats.

Technical orientation is a factor that also should be explicitly identified. Members of the design team assumed Brennan was very comfortable with a terminal and was willing to work with complex command structures. Starr, on the other hand, only wanted to hit one or two keys to get last months sales report. Understanding these different technical orientations is essential when managing the spread of an ESS.

CONCLUSION

This paper has been an attempt to outline the critical ESS implementation issues identified in our field studies. Research in this area is difficult because there are a large number of potential variables and only a small number of

success stories in ESS implementation. But, as the case of SCI indicates, there is much to be learned from some of the failures. And, we believe, it is useful to expose our current conclusions about ESS implementation to encourage further discussion.

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